



ICAO ENGINE nvPM EMISSIONS DATA SHEET

SUBSONIC ENGINES

ENGINE IDENTIFICATION: PW1428GA-JM BYPASS RATIO (-): 12.1
 UNIQUE ID NUMBER: 01P22PW177 PRESSURE RATIO π_{co} (-): 33.3
 COMBUSTOR: TALON X, Block-D
 ENGINE TYPE: TF RATED OUTPUT F_{co} (kN): 132.4

REGULATORY DATA

CHARACTERISTIC VALUES:	LTO_{mass}/F_{co} (mg/kN)	LTO_{num}/F_{co} (particles/kN)	NVPM MASS CONCENTRATION ($\mu\text{g}/\text{m}^3$)
LTO/ F_{co} AND MAX nvPM _{mass}	41.6	1.14E+15	1255
AS % OF CAEP/10 LIMIT	-	-	21.8
AS % OF CAEP/11 LIMIT (InP)	2.3	9.7	
AS % OF CAEP/11 LIMIT (NT)	12.4	27.1	

MEASURED DATA

MODE	POWER SETTING (% F_{co})	TIME minutes	FUEL FLOW kg/s	EMISSIONS INDICES*		NVPM MASS CONCENTRATION PEAK nvPM _{mass} ($\mu\text{g}/\text{m}^3$)
				EI _{mass} (mg/kg)	EI _{num} (particles/kg)	
TAKE-OFF	100	0.7	0.870	32.4	3.84E+14	
CLIMB OUT	85	2.2	0.720	24.5	4.19E+14	
APPROACH	30	4.0	0.250	0.3	3.26E+13	
IDLE	7	26.0	0.090	3.1	3.76E+14	
LTO TOTAL (kg, mg, number of particles)			332	3965	1.09E+17	-
NUMBER OF ENGINES				1	1	1
NUMBER OF TESTS				4	4	4
AVERAGE LTO/ F_{co} VALUES (mg/kN, particles/kN)				30.0	8.21E+14	-
MAX EI VALUES (mg/kg, particles/kg) AND MAX MASS CONC. ($\mu\text{g}/\text{m}^3$)				32.4	4.22E+14	975

* Emissions Indices are corrected for thermophoretic loss and fuel hydrogen content

DATA FOR EMISSIONS INVENTORIES (ESTIMATIONS FOR ENGINE EXIT PLANE VALUES)

MODE	POWER SETTING (% F_{co})	CORRECTED EMISSIONS INDICES	
		EI _{mass_SL} (mg/kg)	EI _{num_SL} (particles/kg)
TAKE-OFF	100	39.8	1.19E+15
CLIMB OUT	85	31.0	1.45E+15
APPROACH	30	0.6	3.02E+14
IDLE	7	6.8	3.72E+15

AMBIENT CONDITIONS

	From		To	
	BAROMETER (kPa)	101.5	102.2	HEAT OF COMBUSTION (MJ/kg)
TEMPERATURE (K)	279.6	300.8	HYDROGEN CONTENT (%mass)	13.89
HUMIDITY (kg water/kg dry air)	0.0036	0.0120	AROMATICS CONTENT (%vol)	16.5
			NAPHTHALENE CONTENT(%vol)	0.74
			SULPHUR CONTENT (ppm by mass)	228

MANUFACTURER: Pratt & Whitney
 TEST ORGANIZATION: Pratt & Whitney
 TEST LOCATION: W. Palm Beach, FL
 TEST DATES: 18/01/2020-21/01/2020

REMARKS

1. Data from certification report PWA-12091
2. 1 engine tested
3. TALON-X, Block-D combustor
4. Certification in accordance with ICAO Annex 16 Vol. II., Part III, Chapter 4.